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A REVIEW OF THE APHODIINE BEETLES
OF THE GALAPAGOS ISLANDS
(COLEOPTERA: SCARABAEIDAE)¹

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The discovery of the genus *Diastictus* on Isla Wolf, confusion of names due to misidentification, and synonymy in the reported species of *Ataenius*, initiated the following brief review of the Aphodiinae found on the Galapagos Islands. The study was made possible by the generous loan of all of the many specimens in the California Academy of Sciences collection, by my good fortune in seeing many other specimens in American collections, and in Paris and London museums. Paratypes of all previously described species except *Ataenius atramentarius* (Erichson) have been examined. Of the latter I have seen a good series in the British Museum in London.

As might be surmised, since the Galapagos Islands are nearest the South American mainland, at least part of the coleopterous fauna has been derived from this continent. Linell, 1898, and Van Dyke, 1953, as well as other authors listed in the very comprehensive bibliography covering the insects of the Galapagos Islands by Linsley and Usinger, 1966, have pointed to South America as the original source of much of the fauna. Van Dyke believed, "The coleopterous fauna is definitely related to that of the barren grounds of western South America especially Ecuador and Peru, and no doubt derived from them at some period long ago." Hurd, 1958, in discussing carpenter bees expressed his belief that, "when the faunal relationships of the Galapagos Islands are considered

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in the light of those of continental areas, the faunal affinities are much closer with those of Central America. There is some evidence which suggests that the Galapagos Islands were at one time connected by a series of islands to Central America." Linsley and Chemsak, 1966, in two papers on the Cerambycidae of the Galapagos Islands, and of Cocos Island, also found affinities with mainland South America, Central America and the West Indies. Two Cocos Island species are found in the West Indies. One of them was described from Cuba.

Based on my limited knowledge of the Aphodiinae of South and Central America, and the West Indies, I believe two of the known species probably were derived from species originating in South America, one from Central America, one possibly from the West Indies and one from an endemic on another Galapagos Island. Such an assumption must be pure conjecture of course since it is impossible to be sure from which species and exact area the progenitors came. The only species of *Diastictus* is closely allied to a similar species from Colombia. *Ataenius atramentarius* (Erichson) was described from Peruvian specimens. *Ataenius arrowi* Hinton and *cavagnaroi* n. sp. are close to *nugator* Harold, 1880, which occurs from southern United States, through Central America (Costa Rica) and into Argentina and Chile. *Ataenius aequatorialis* Petrovitz is similar to the West Indian species *A. vincentiae* Arrow. *Ataenius cavagnaroi*, thus far found only on Isla Fernandina, may have been derived from the more widely dispersed, very closely related endemic species *arrowi* which is known from Isla Santiago, Isla Santa Cruz, Isla Pinta, and Isla Isabella.

So far as we know at present all known Aphodiinae found on the Galapagos Islands are endemic except *Ataenius atramentarius*.

KEY TO GENERA AND SPECIES

1. Length less than 3 mm.; clypeus verrucose; first segment of hind tarsus equal to the length of the following segments combined *Diastictus darwini* n. sp.

- Length usually more than 3 mm.; clypeus simply punctate, never verrucose; first segment of hind tarsus much longer than following two combined *Ataenius* spp. 2
2. Length 5.2 to 5.4 mm.; elytral intervals weakly convex over anterior disc, over apical third intervals carinate, laterally eroded and alutaceous
..... *A. atramentarius* (Erichson)
- Length less than 5.0 mm.; elytral intervals weakly to moderately convex or carinate over entire length 3
3. Length 4.4 to 4.6 mm.; clypeus rounded each side of median emargination; elytral intervals weakly evenly convex; sutural interval impunctate; male anterior spur hooked; tip of tibia and first tarsal segment densely clothed with long hair 4
- Length 2.9 to 3.5 mm.; clypeus finely dentate each side; elytral intervals carinately convex entire length, sutural interval strongly punctate *aequatorialis* Petrovitz
4. Dull surface lustre; elytral striae fine, not noticeably crenate, punctures fine; intervals noticeably alutaceous, very weakly convex *cavagnaroi* n. sp.
- Shining surface lustre; elytral striae moderately crenate-punctate; intervals shining, moderately convex
..... *arrowi* Hinton

***Diastictus darwini* Cartwright new species**

Holotype: Length 2.3 mm., width 1.0 mm. Shining, dark castaneous, convex, oblong-oval, widest at apical third. Antennae testaceous. Head strongly convex; clypeal margin evenly rounded each side of moderately deep median emargination, edge narrowly reflexed, surface moderately verrucose, genae sharply rounded, nearly right-angled, a sharply defined anteocular groove extending upward from gena around the eye; occiput with mixed fine and minute punctures.

Pronotum convex, one-fourth wider than long, anterior angles obtuse, posterior angles broadly rounded, sides nearly straight but due to convexity not visible from directly above except over anterior third; postapical groove deep in anterior angles causing the angles to appear explanate, the groove continued upward to disc in a series of closely placed moderate punctures leaving a smooth, minutely punctate anterior edge, a similar smooth area laterally outside fovea into the posterior angles, disc with moderately coarse scattered punctures generally separated by one or more times their diameters, longitudinal, vaguely

impressed median line indicated by row of similar punctures; lateral and basal marginal line well defined.

Elytra one-third longer than wide, sides slightly divergent to apical third; striae strong, deep, crenately punctate; intervals weakly convex, smooth but with a row of very minute punctures and indistinct very minute alutaceous sculpture near striae, the latter more noticeable on the sutural interval.

Metasternum shining, disc smooth but with scattered minute punctures, median line weakly impressed, very finely alutaceous at sides, triangular area in front of posterior coxae merely flattened and indistinctly alutaceous. Abdominal segments shining very minutely alutaceous especially at sides, crenate along anterior margins, crenations of terminal segment much longer and deeper, at middle about one-third total length of segment. Pygidial transverse eroded area medially interrupted at base, eight pygidial setae.

Middle and posterior femora smooth, shining, posterior marginal line nearly half the length of femur inward from knee. Posterior tarsus more than half the length of the tibia. First segment of posterior tarsus shorter than long spur, apically as wide as length of second segment, as long as two following segments combined.

Holotype, California Academy of Sciences, and six paratypes collected on Isla Wolf, 1 February 1964, by D. Q. Cavagnaro; two paratypes from Isla Darwin, 29 January 1964, by D. Q. Cavagnaro. Paratypes in the California Academy of Sciences and Smithsonian Institution.

Paratypes vary in length from 2.2 to 2.7 mm., in color from dark castaneous to piceous. The coarse pronotal punctures are slightly more numerous and the median longitudinal line slightly deeper in some specimens. Pygidial setae number 6 or 8.

Diastictus darwini is nearest *D. gregalis* (Cartwright), new combination, from Colombia, South America. It differs in being noticeably broader, with less convex elytral intervals, a shallower less noticeable metasternal midline and in being uniform in color, not darker laterally than on disc of elytra.

Ataenius atramentarius (Erichson), 1847-110

Euparia atramentarius Erichson, 1847-110.

Ataenius atramentarius: Harold, 1869-1066.

Ataenius dampieri Petrovitz, 1961-356. (New synonymy)

Ataenius scutellaris: Van Dyke, 1953-123. (not Harold 1867-82)

Erichson placed *atramentarius* in *Euparia*, noting the species had been collected in Peru. I have examined nine specimens of *atramentarius* in the British Museum and compared paratypes of *dampieri* Petrovitz with one of them. I can find no differences. In the original description of *dampieri*, Petrovitz states his species is distinguished by the short hairs of the elytra and the shortened posterior marginal line of the hind femur. Since these characters are exactly duplicated in the Peruvian

specimen of *atramentarius* and I can find no differences otherwise, it is unfortunately necessary to place *dampieri* in synonymy.

Van Dyke misidentified this species as *At. scutellaris* Harold. Among the specimens he listed was a single specimen from Isla Isabella (Albemarle Island) not now in the Academy Collection.

I have seen *A. atramentarius* (Erichson) from Isla Floreana (Charles Island), Isla Pinta (Abingdon Island), and Isla San Cristobal (Chatham Island).

Ataenius aequatorialis Petrovitz, 1961-355

Ataenius aequinoctialis Petrovitz, 1961-355. (Lapsus calami)

This species was described from Santa Cruz in 1961. It is the smallest of the Galapagos *Ataenius* and of the known species it is the only one with dentate clypeus. Except for the more evident short fine elytral pubescence and subcarinately convex elytral intervals, *aequatorialis* resembles *exiguus* Brown or a small *abditus* (Haldeman), as well as *vincentiae* Arrow as pointed out by Petrovitz. *At. vincentiae* differs in having the entire cariniform convex ridge of the elytral intervals broken by a median row of punctures and by having closer, shallower pronotal punctures.

All specimens examined were collected on Isla Santa Cruz (Indefatigable Island).

Ataenius arrowi Hinton, 1936-414

Fig. 1

Dr. Hinton described *arrowi* from James Island in 1936. The series before me were collected on the Horneman Ranch, Isla Santa Cruz, February and March 1964 and on Isla Darwin in January 1964.

The males of *arrowi* are much more shining than the females, the pronotal punctures are less dense and finer, the anterior tibial spur is bent inward at the tip, and the end of the posterior tibia and tarsus are quite hairy. The posterior tibial fringe of *arrowi* is usually composed of a group of five short close setae. The short accessory spine is close to the spurs without an intervening seta.

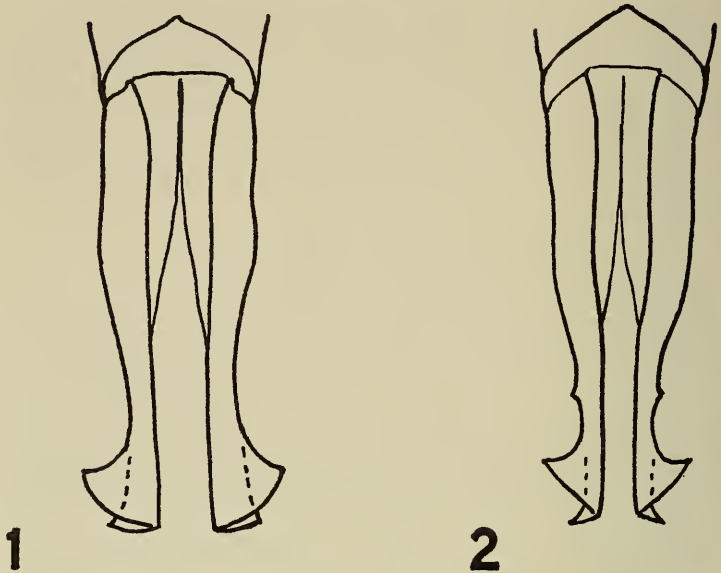
I have seen specimens of *arrowi* Hinton from Isla Santiago (James Island), Isla Santa Cruz (Indefatigable Island), Isla Pinta (Abingdon Island), and Isla Isabella (Albemarle Island).

The specimens from Isla Pinta frequently show slight differences such as having more uniform head punctures and the 10th elytral intervals slightly flatter than 9th but I can find no other differences.

Ataenius cavagnaroi Cartwright new species

Fig. 2

Holotype male.—Length 3.9 mm., width 1.8 mm. Piceous, finely alutaceous, weakly shining, elongate, moderately convex. Head moderately convex; genae nearly right angled; clypeus rounded each side of moderate median emargination, edge finely reflexed, surface very finely



FIGS. 1, 2.—Dorso-caudal view of the lateral lobes of the male genitalia: 1—*Ataenius arrowi* Hinton, 2—*Ataenius cavagnaroi* n. sp.

punctate, the punctures generally separated by almost twice their diameters, band of frontal punctures coarse, about two to three times the diameter of the clypeal puncture and separated by less than half their diameter except in basal or occipital area where they are less dense. Parts of the clypeus have been broken away on each side of the median emargination but remainders of the sides are practically straight to angles of the genae.

Pronotum 1.6 mm. wide, 1.1 mm. long, very moderately convex; lateral and basal marginal line fine, edge barely broken by extremely short, fine setae, widely spaced laterally, more closely posteriorly around posterior angles, anterior angles obtusely rounded, posterior angles distinct but rather broadly rounded; surface densely punctate with mixed coarse and fine punctures throughout, the finer punctures usually half or more the diameter of the larger, usually separated by the diameter of the smaller or less, laterally, especially in the anterior angles the punctures are shallower and alutaceous within, surface between punctures very finely alutaceous.

Elytra 2.6 mm. long, 1.8 mm. wide, oblong oval, humeri finely dentate; striae fine, very weakly crenate with very fine punctures; intervals, all alike, weakly convex, the first three almost flat, surface alutaceous with scattered minute punctures separated by four or more times their diameters.

Metasternum concave lengthwise, shining and smooth over middle disc, a moderately strong and deep midline ending anteriorly in wider deeper pore, outer edges of disc very finely and closely punctate, with slightly larger punctures outward to sides, more strongly alutaceous at extreme sides, triangular depressed area in front of hind coxae deep and finely alutaceous. Abdominal segments alutaceous, with scattered moderately fine rather shallow punctures throughout, a trifle larger toward sides, separated by one or more times their diameters, segments finely crenate along anterior margin. Eroded area of pygidium strongly alutaceous and with very indistinct shallow punctures, shining margin noticeably widened apically.

Spur of anterior tibia bent inward at tip, tibial margin serrate above apical teeth, femur with perimarginal groove, surface closely, roughly, coarsely, shallowly punctate. Middle and hind femora with moderately fine punctures rather irregularly but closely spaced except along anterior margin and near knee; posterior marginal line half the length of the femur inward from knee. Posterior tibia with four closely spaced fimbriae, short accessory spine close to spurs without intervening seta, first tarsal segment a trifle longer than long spur. Remaining segments of hind tarsi missing.

Unique holotype, California Academy of Sciences, collected on Isla Fernandina, W. side, 1,100 ft., 5 February 1964, D. Q. Cavagnaro collector. The species is named after its collector.

This species is closely related to *Ataenius arrowi* Hinton but the pronotal punctures are much coarser and denser than in males of that species and they show less disparity in size than in females of *arrowi*. The strongly alutaceous elytral intervals are much flatter, the striae and their punctures are fine, and the crenations much less noticeable than in *arrowi*. The distinctly serrate anterior tibiae are noticeable. The parameres of the male aedeagus show a distinct lateral tooth, see fig. 2, which is lacking in *arrowi*.

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